

1 **WHAT IS CLAIMED IS:**

2 1. A signal processing building block for use in an adaptive signal processing

3 system comprising:

4 a main input channel which receives a main input signal;

5 an auxiliary input channel which receives an auxiliary input signal; and

6 a processing mechanism that:

7 generates a complex adaptive weight,

8 applies the computed complex adaptive weight to a function of the main input

9 signal and the auxiliary input signal to generate an output signal.

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11 2. An adaptive signal processing system as in claim 1, wherein the processing

12 system generates a complex adaptive weight which comprises: a sample median value of

13 the real part of the ratio of a main input weight training data signal to an auxiliary input

14 weight training data signal, and a sample median value of the imaginary part of the ratio of

15 a main input weight training data signal to an auxiliary input weight training data signal.

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17 3. An adaptive signal processing system as in claim 1, wherein the processing

18 system generates a complex adaptive weight which comprises a sample median value of

19 the real part of a ratio of a main input weight training data signal to an auxiliary input

20 weight training data signal.

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1 4. An adaptive signal processing system as claimed in claim 1,
2 wherein the processing mechanism generates the complex adaptive weight, w_{med} ,
3 by solving the equation:

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$$w_{med} = MED_{k=1 \text{ to } K} \left[\text{real} \left(\frac{z(k)^*}{x(k)^*} \right) \right] + j \left\{ MED_{k=1 \text{ to } K} \left[\text{imag} \left(\frac{z(k)^*}{x(k)^*} \right) \right] \right\}$$

5 where K is the number of weight training data samples, z is the main input signal, j is a
6 unit imaginary number, and x is the auxiliary input signal.

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8 5. An adaptive signal processing system as claimed in claim 4, wherein the
9 processing mechanism generates the output signal, r, by solving the equation:

10 $r = z - w_{med}^* x.$

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12 6. An adaptive signal processing system for receiving a plurality of input signals
13 corresponding to a common target signal and for sequentially decorrelating the input
14 signals to cancel the correlated noise components therefrom, the adaptive signal processing
15 system comprising:

16 a plurality of building blocks arranged in a cascaded configuration for sequentially
17 decorrelating each of the input signals from each other of the input signals to thereby yield
18 a single filtered output signal;

19 wherein each building block includes:

20 a local main input channel which receives a local main input signal,
21 a local auxiliary input channel which receives a local auxiliary input signal,
22 and

1 a processing mechanism that
2 calculates a complex adaptive weight, and
3 generates a local output signal, utilizing the complex adaptive
4 weight.

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6 7. An adaptive signal processing system as in claim 6, wherein the complex
7 adaptive weight comprises: a sample median value of the real part of the ratio of a main
8 input weight training data signal to an auxiliary input weight training data signal, and a
9 sample median value of the imaginary part of the ratio of a main input weight training data
10 signal to an auxiliary input weight training data signal..

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12 8. An adaptive signal processing system as in claim 6, wherein each building block
13 supplies the local output signal to a local output channel.

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15 9. An adaptive signal processing system as claimed in claim 6,
16 wherein each building block generates the complex adaptive weight, w_{med} , by
17 solving the equation:

$$18 \quad w_{med} = MED_{k=1 \text{ to } K} \left[real \left(\frac{z(k)^*}{x(k)^*} \right) \right] + j \left\{ MED_{k=1 \text{ to } K} \left[imag \left(\frac{z(k)^*}{x(k)^*} \right) \right] \right\}$$

19 where K is the number of weight training data samples, z is the local main input signal, j is
20 a unit imaginary number, and x is the local auxiliary input signal; and
21 each building block generates the local output signal, r, by solving the equation:

$$22 \quad r = z - w_{med}^* x.$$

1 10. An adaptive signal processing method comprising:
2 receiving a plurality of input signals corresponding to a common target signal;
3 inputting the input signals into a plurality of building blocks arranged in a cascade
4 configuration for sequentially decorrelating each of the input signals from each other of the
5 input signals;
6 generating a single filtered output signal;
7 wherein each building block includes a local main input channel which receives a
8 local main input signal, a local auxiliary input channel which receives a local auxiliary
9 input signal, and a processing mechanism that calculates a complex adaptive weight, and
10 generates a local output signal, utilizing the complex adaptive weight.

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12 11. An adaptive signal processing method as in claim 10, wherein each building
13 block generates the complex adaptive weight w_{med} by calculating a sample median value
14 of the real part of a ratio of a main input weight training data signal to an auxiliary input
15 weight training data signal and calculating a sample median value of the imaginary part of
16 the ratio of a main input weight training data signal to an auxiliary input weight training
17 data signal.

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19 12. An adaptive signal processing method as in claim 10, wherein each building
20 block generates the complex adaptive weight w_{med} by calculating a sample median value
21 of the real part of the ratio of a main input weight training data signal to an auxiliary input
22 weight training data signal.

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1 13. An adaptive signal processing method as in claim 10, wherein each building
2 block generates the complex adaptive weight w_{med} by calculating a sample median value
3 of the imaginary part of a ratio of a main input weight training data signal to an auxiliary
4 input weight training data signal.

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6 14. An adaptive signal processing method as claimed in claim 10,
7 wherein each building block generates the complex adaptive weight, w_{med} , by
8 solving the equation:

$$9 \quad w_{med} = MED_{k=1 \text{ to } K} \left[real \left(\frac{z(k)^*}{x(k)^*} \right) \right] + j \left\{ MED_{k=1 \text{ to } K} \left[imag \left(\frac{z(k)^*}{x(k)^*} \right) \right] \right\}$$

10 where K is the number of weight training data samples, z is the local main input signal, j is
11 the unit imaginary vector, and x is the local auxiliary input signal.

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13 15. An adaptive signal processing method as claimed in claim 14, wherein each
14 building block generates the local output signal, r, by solving the equation:

$$15 \quad r = z - w_{med}^* x.$$

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17 16. An adaptive signal processing system comprising:

18 a means for receiving a plurality of input signals corresponding to the same target
19 signal;

20 a means for inputting the input signals into a plurality of building blocks arranged
21 in a cascade configuration for sequentially decorrelating each of the input signals from
22 each other of the input signals;